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THE fellow who wins is the one who can come right back after every blow—the man who can stand the punishment and come up smiling every time—the one who increases his determination as the resistance to his purpose increases and holds on to his invincible faith in himself and the ultimate success of his efforts.

The power of will and even temperament which are exercised under the most trying conditions often measure the difference between success and failure.

When you are fighting the battles of life and business, it is not alone the natural opposition you are struggling with—but SELF, the one individual you must be able to conquer and dictate to at all times.

NOTHING will put a man in tune with the Universe and keep him in perfect harmony with his work like getting on the job early in the morning and taking advantage of the full day that Nature provides out of every twenty-four hours.

Work is a natural habit of man—the best one he can have in business—and when he acquires that habit and makes it a part of himself everything else seems to work out to his liking.

There may be variations in the net results of the days, but the sum total of the months and years will work out right by any mathematical equation.

That is a law which will govern you and me in whatever we do.

MONTHLY REVIEW

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American Electroplaters' Society

ONEIDA, NEW YORK

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EDITORIAL

NOTICE

New York, October 17, 1923.

To the Officers and Members of the A. E. S.:

I wish to announce that the Supreme Executive Board, in conformity to the wishes of the delegates, as expressed at the Providence Convention, is formulating plans to award prizes for the best paper and best exhibit presented at the coming Supreme Convention, to be held in Milwaukee, Wis., June 30-July 1, 2 and 3, 1924.

I would earnestly urge every one of our members to compete for one of these prizes; there will be three awarded for the best papers, and three for the best exhibit, so get busy at once, so you will have plenty of time to get up something of value.

I also wish to announce the names of the members of the Research Committee for 1923-24. They are: Charles H. Proctor, 264 Argyle Place, Arlington, N. J.; S. E. Hedden, 227 5th street, Aspinwall, Pa., and O. J. Sizelove, 950 Chancellor avenue, Irvington, N. J. I would respectfully ask the membership to give whatever assistance they can to this committee. I know they will appreciate any help that they may receive. If you have any plating problems, send them in to the committee, either directly or through the columns of the REVIEW. In this way you will not only be assisting the committee but also yourself as well as the rest of us. Before closing I wish to call your attention to the fact that the Milwaukee Convention Committee intends to obey the wish expressed at Providence by our delegates, and are making arrangements to hold a monster exhibition

in connection with the convention. This will be the only exhibition held under the auspices of the Supreme Society this year, and I would respectfully request our members, both as individuals and branches, to give the Convention Committee their whole-hearted support in this project, so that it will be a grand success. It might be a good idea for each branch to purchase a booth to exhibit the samples of the work of their members and make it their headquarters during the convention.

In closing I wish to thank all those members who have shown their loyalty to and interest in the A. E. S. by the work of various kinds they have done during the present administration up to date, and assure them that I appreciate it.

Yours fraternally,
JOHN E. STERLING,
Supreme President.

EX ORIENTE LUX

E. G. Lovering

Am very much interested in Mr. Proctor's paper, "Guaranteed Electro Plating." Every one favors better electroplating, but there are many factors to be considered in commercial plating before a guarantee can be given. Production, we are sorry to say, is the paramount issue of this present age. If it were possible to extend the rush output over a period of twelve months, instead of seven, it would simplify matters considerably, but this is a manufacturing impossibility, as the supply is governed by the demand. Mr. Proctor says, train the people to appreciate better products that give better protection and they will willingly pay the price. Would that there were at this moment a "Modern Moses" that would lead the general public out of the wilderness into the light; until then we are afraid the bargain counters will continue to have their usual rush. Don't believe there is a member of this society who would not much rather do a good job of plating than a poor one, but surrounding conditions often make this an impossibility. The first question asked in any of our large manufacturing plants of an executive or foreman is, "Do you thoroughly understand production work?" Many shipments are prom-

ised at a certain time to please a customer and the work must be produced. The plating room of a large factory must be on the same productive basis as all other departments and in many cases more efficient, as his part is on the finishing end and he is called upon to expedite a shipment due to delay in other departments. In many cases the plater is handicapped with inefficient equipment, poor location of plating room, not the proper facilities for handling work and lack of co-operation with the purchasing department to get proper supplys. And we hear again, "Our plating department is costing too much," but insisting at the same time production must be kept up, "competition is keen, costs must be kept down." These are circumstances over which the commercial plater has no control. Now, from our society's point of view can we answer the following questions?:

What is the proper amount of deposit for servicable wear?

What is a simple method of testing the thickness of and wearing qualities of a deposit?

If zinc is the best protective coating for steel, why do we use any other metal?

Have we developed a practical method for commercial nickel plating on zinc plated steel, one with a high finish, one we can guarantee?

What constitutes a heavy deposit of nickel, copper or zinc?

Is cadium as good or a better protection for steel than zinc?

Is nickel plating direct on steel, then copper and again nickel plated, any better protection than zinc plated steel? Some sepcifications call for this method.

Is it possible to get a uniform deposit on all parts of irregular shapes in comercial plating, one that we can guarantee? According to Mr. Hogaboom, the deposit is heavier on top in an agitated solution and in a still solution it is heavier at the bottom.

Is it possible to controll the amount of deposit taken off in the buffing operation, particularly on parts with sharp corners and low background that must be buffed to a high color? Who could you get to do it for you?

Is it possible in a factory turning out thousands of pieces daily to have every one uniform and the same amount of deposit on each?

Have some of us been able to absolutely control pitting?

What is the proper current density to use to deposit a fine grained adherent nickel, copper or zinc deposit?

Will a thin hard nickel deposit give as much servicable life as a heavier soft deposit? "Hopes that glitter in the laboratory often lose their brilliance under the test of quantity production."

Are we able to control the spotting out on steel plated parts which eventually cause rusting?

How long a time should commercial nickel plated or zinc plated parts stand up?

Some people apply steel wool, pumice stone, an abrasive polish or other improper methods to keep up the original finish.

Is not nickel plating a more decorative than a protective coating on steel?

Mr. Proctor says, "Let us have more Roger 1847 guarantees in the electroplating industry." Them's my sentiments. If the automobile industry could use the same mode of procedure as the silverware manufacturers we would be very close to that millennium, Bro. Proctor. After a silver deposit is put on it is generally burnished, this draws the deposited metal together, closing up the pores, making a compact coating entirely protecting the base metal and hermetically sealing it. The burnishing tool reaches the low spots without cutting off any of the metal on the high spots, as in buffing nickel copper or zinc work. If we could apply the burnishing method on all other plating we would be close to our goal. All deposits are more or less porous and not the best protector from corrosin and we have to resort to a buffing operation to draw that deposited metal together to get results simular to the burnishing operation, only a great deal of the deposit is removed. This operation is called buffing out the scratches. This cannot be performed on all classes of work, such as automobile rims &c. so the metal is left just as it is deposited. A plating plant that plated 30 to 40 thousand pieces daily—9 hours—of copper, zinc, nickel and silver, has specifications from one firm call-

ing for a nickel deposit of .0004 inch, to stand a bend of 45 degrees on brass. Another firm getting the same parts specifies .0002 inch deposit. Now we believe that the standardization committee of our society and the engineering department that draw up plating specifications in the large manufacturing plants should cooperate and make tests as to what constitutes a commercial deposit for serviceable wear &c. Also what is practical and practicable.

ANALYSIS OF DOUBLE AND SINGLE SALT NICKEL PLATING SOLUTIONS

R. L. Shepard—B. F. Lewis

Detroit Branch, American Electro-Platers' Society

The following procedure for the routine analysis of double and single salt nickel plating solutions has been evolved by the authors in their work of establishing laboratory control of the plating solutions used in nickeling zinc base die castings, brass stampings and brass castings. The apparent general use of this type of solution for such work makes it seem probable that detailed directions for its complete analysis would be of general interest to electro-chemists working in this field. Constant use in the form given below for the past four to six months has served to demonstrate not only the efficacy of these particular methods, but also the value of laboratory control of solutions in the efficient operation of the modern plating plant.

The method given covers the analysis of solutions containing any combination of the following compounds. Acid and basic radicals in other forms and organic matter other than citrate and glycerine are assumed to be absent:

Single nickel salt	$NiSO_4\ 7H_2O$
Double nickel salt	$NiSO_4(NH_4)_2SO_4\ 6H_2O$
Epsom salt	$MgSO_4\ 7H_2O$
Common salt	NaCl
Sodium citrate	$2Na_3C_6H_5O_7\ 11H_2O$
Boric acid	H_3BO_3
Glycerine	$OHCH_2CHOHCH_2OH$
Iron	Fe
Zinc	Zn
Copper	Cu
Lead	Pb
Acid	pH

Modifications of the method, however, will be readily apparent to the experienced analyst who needs to determine the same radicals used in other common forms such as the following:

Sal Ammoniac	NH_4 CL
Ammonium sulphate	$(NH_4)_2SO_4$
Nickel chloride	$NiC1_2$ $6H_2O$
Citric acid	$H_8C_6H_5O_7H_2O$
Borax	$Na_2B_4O_7$ $10H_2O$

The greatest efficiency, in point of time, is effected by analyzing several solutions simultaneously, and if reasonable precautions are observed the accuracy of the results obtained will be well within the requirements of the work.

The plating bath should be thoroughly stirred just before taking the sample since the solution stratifies under operating conditions. Eight fluid ounces are ordinarily sufficient for the complete analysis and for a file sample. The entire sample is immediately filtered to remove suspended matter; use of a 10-inch qualitative filter and a 5-inch funnel is satisfactory. Iron may precipitate in the filtrate on standing, but should be included in the iron determination since it was in solution at the time of sampling.

The determination of glycerine and lead is included in this method because they are coming into some use at the present time in the securing of bright nickel deposits.

In submitting these methods of analysis no claim to originality in the principles involved is inferred. In most cases the methods are modifications of standard procedures in general use. The purpose of this paper is to collect such material as may be available from various sources and by simplifying at some points in the interest of expediency, and elaborating at other points in view of difficulties presented by conditions peculiar to the work in hand, to formulate a procedure best adaptable to the control of the nickel plating solutions.

1. TOTAL NICKEL

Preparation of Reagents

Prepare a solution of nickel by dissolving 15 grams of pure nickel ammonium sulphate in one litre of water. Since this salt crystallizes according to the definite formula $NiSO_4$ $(NH_4)_2SO_4 6H_2O$ its theoretical nickel content may be taken

to be 14.85%, giving the above solution a concentration of .00223 grams of nickel per cc. This figure should be checked by an electrolytic determination of the nickel if a high degree of accuracy is required.

Make up stock solutions of 20% potassium iodide, 60% citric acid and 25% sulphuric acid.

Prepare a standard solution of potassium or sodium cyanide containing about 6.0 grams per litre, and a standard solution of silver nitrate containing 5.65 grams per litre. To determine the relative strength of these solutions, measure from a burette exactly 10 cc. of the KCN solution into a flask, add 25 cc. water, 1 drop of ammonia and 2 cc. KI. Titrate with the standard silver nitrate to a slight permanent opalescence.

$$\frac{\text{c.c. Ag. } NO_3}{10} = \text{KCN factor of the Ag. } NO_3$$

Note—The nickel solution is the primary standard. The KCN is somewhat unstable and should be restandardized for each day's batch of determinations. The Ag NO_3 solution is stable, and since it is used for the back titration, it is convenient to use it at the same time for restandardizing the KCN.

Calculations are simplified by adjusting the strength of the $AgNO_3$ solution so that 1 c.c is equivalent to exactly .001 gram of nickel.

To standardize the 6.0 gram per litre solution of KCN against the 15.00 gram per litre solution of nickel ammonium sulphate, pipette 50 cc. of the latter into a 250 c.c. beaker and dilute to about 100 c.c. Add 5 c.c. of the citric acid solution and 25 c.c of the dilute sulphuric acid and 5 c.c of HC1. From a burette add exactly 2 c.c. of the standard silver nitrate solution. Now add ammonia to a slight excess as indicated by the disappearance of the AgC1 precipitate. Bring back to slight acidity with dilute H_2SO_4 and then, with dilute ammonia, make the solution very slightly alkaline. Cool to room temperature and add 2 c.c KI solution. From a bruette run in sufficient KCN solution to dissolve the precipitate of nickel iodide and about 1 c.c in excess. Titrate back with the standardized $AgNO_3$ solution until a distinct and permanent precipitate appears.

$$\frac{50 \times .00223}{(\text{c.c. KCN} \times \text{KCN factor of Ag. } NO_3) - \text{c.c. Ag } NO_3} = \text{Grams Ni per cc. KCN} = \text{Ni factor of the KCN}$$

Note—Volume of $AgNO_3$ consumed in back titration plus the 2 c.c. added previously constitute total volume of $AgNO_3$ to be used in the above computation.

DETERMINATION:

Pipette exactly 25 c.c of the plating solution into a 250 c.c. volumertic flask, dilute to volume and draw off a 50 c.c. aliquot into a 25 c.c. beaker. Prepare for titration as in the case of the standard nickel solution, and titrate with the KCN and $AgNO_3$ solutions as in the standardization of the KCN solution.

$$\frac{((\text{C.C. KCN} \times \text{KCN factor of } AgNO_2) - \text{c.c. } AgNO_3) \times \text{Ni factor of KCN} \times 133.5}{5} = \text{Ounces per gallon Total Nickel}$$

2. DOUBLE NICKEL SALT (Nickel Ammonium Sulphate)

Pipette 50 c.c. of the original solution into a round-bottom distillation flask containing a few glass beads to prevent bumping. Add 100 c.c. of water and 50 c.c. 10% NaOH solution and connect immediately to a condenser fitted with spray-trap and having its discharge end immersed in 25 c.c N/1 HC1 solution. Distill at a moderate rate until 100 to 150 c.c. have passed over. Titrate the excess acid with N/1 Na OH and calculate the acid consumed by the distillate to $NiSO_4(NH_4)_2SO_4\ 6H_2O$.

$$\frac{\text{C.c. N/1 HCl} \times .018 \times 10.98 \times 133.5}{50} = \text{ounces per gal. Double Salt}$$

3. SINGLE NICKEL SALT (Nickel Sulphate)

((Oz. per gal. Total Nickel — (Oz. per gal. Double salt x .1485)) x 4.79=Oz. per gal. $NiSO_4 7H_2O$

4. EPSOM SALT (Magnesium Sulphate)

Pipette 10 c.c. of the sample into a 250 c.c. beaker. Add 10 c.c. concentrated H_2SO_4 and evaporate slowly to fumes. Add carefully a few drops of conc. HNO_3, keeping the beaker covered. Continue heating until all of the nitric acid is expelled. Cool and dilute with water to 100 c.c. Digest until clear. Cool again and add ammonia to slight excess

Boil and filter off precipitated hydroxides, washing with hot water. Reserve the residue. Make the filtrate slightly acid with HC1 and cool. Add 20 c.c. of a 10% solution of ammonium di-phosphate, 75 c.c. of ammonia, and stir thoroughly. Allow to stand until clear. Filter through a coarse filter paper and wash thoroughly with 10% NH_4OH. Ignite the precipitate in a porcelain crucible, raising the temperature slowly up to a bright red. eigh as magnesium pyrophosphate.

$$\frac{\text{Wt. } Mg_2P_2O_7 \times 2.214 \times 133.5}{10} = \text{Oz. per gal } MgSO_4 7H_2O$$

Note—In the case of solutions containing less than two ounces to the gallon of epsom salt it is desirable to use a larger portion for analysis.

5. COMMON SALT (Sodium Chrolide)

From the portion containing 25 c.c. of the plating solution diluted to 250 c.c. (Nickel determination) pipette 10 c.c. into a 250 c.c. beaker. Dilute to 150 c.c. and add 5 c.c. HNO_3. Heat to boiling and add about 4 c.c. of a 10% solution of $AgNO_3$ solution. Continue boiling until the silver chloride coagulates. Cool the solution, and when the precipitate settles add one or two drops of the $AgNO_3$ solution. If no further precipitation occurs, filter the solution through a tared Gooch crucible and asbestos mat. Wash well with hot water and dry at 105° C. Cool and weigh.

Wt. of AgC1 x .408 x 133.5=Oz. per gal. NaC1

6. SODIUM CITRATE

Pipette 25 c.c. of the plating solution into a round-bottom flask containing a few glass beads. Add 25 c.c. of 25% H_2SO_4, 150 c.c. of water, 10 c.c. of a staturated solution of $KMnO_4$, and connect at once, by means of a spray-trap, to a condenser whose discharge end is immersed in 100 c.c. of a saturated solution of barium hydrate.

This solution should be contained in a flask fitted with a stopper perforated to receive the condenser tube and an outlet tube filled with one of the several CO^2 absorbents to prevent contact of the air with the Ba $(OH)_2$ solution. Heat the solution in the distilling flask until 100 c.c. have passed over. At this point the sodium citrate decomposes with the evolution of CO_2, which precipitates barium carbonate in

the receiving flask. As quickly as possible, filter the $BaCO_3$ upon a paper pulp mat, by means of a funnel and aspirator flask, and wash with hot water. Replace precipitate and mat in a clean flask, disintegrate with water and add sufficient N/10 HCl to dissolve the precipitate and leave a small excess of acid. Add methyl orange indicator solution and bring the solution to boiling. Cool and titrate excess acid with N/10 NaOH.

$$\frac{\text{c.c. N/10 HCl x .003 x 133.5}}{25} = \text{Oz. } 2NA_3C_6H_5O_7\ 11H_2O \text{ per gal}$$

Note—If organic radicles other than citrates are present they will, of course, affect the result. Citric acid, if present, is included in this determination. It is found practical to compute it to sodium citrate, controlling additions of the acid by means of the acidity determination. Glycerine also reacts with the citrate but for this and other organic material known to be present, corrections may be made upon the citrate value by running "blanks" containing known quantities of the interferring compounds. In this way it is found that .00166 c.c. of glycerine consumes 1 c.c. of N/10 HCl when the above procedure is followed. If, then, the quantity of glycerine present in the solution be determined by a method to be described below, proper correction may be applied to the citrate value to compensate for the reaction of the glycerine.

7. GLYCERINE

Pipette 10 c.c .of the plating solution into a 250 c.c. beaker, add 25 c.c. of 25% H_2SO_4, 100 c.c. of water, and for each .10 liquid ounce per gal. of glycerine expected, add 15 c.c. of a solution containing 4 grams per liter of potassium dichromate. Digest at the boiling point for a half hour. Cool and titrate the excess dichromate with a solution of 10 grams of ferrous sulphate plus 100 c.c. 25% H^2SO_4 per litre, using .1% potassium ferricyanide solution as an external indicator, and observing the point where the addition of one or two drops of the ferrous sulphate solution produce a blue color when a drop of the titrated solution is placed in contact with a drop of the indicator solution on a spot plate. Although the titrated solution is itself blue, a distinct end—point may be obtained.

To determine the strength of the ferrous sulphate solution with reference to the dichromate, titrate a measured termine the glycerine value of the dichromate, prepare suitable aliquots of a dilute solution of pure glycerine and tirate as above.

Reduce the volume of F_2SO_4 used in the titration to terms of $K_2Cr_2O_7$ by means of the ratio obtained in the reference titration of the two solutons. Then:

$$\frac{(\text{C.c. } K_2Cr_2O_7 - (\text{Corrected volume Fe } So_4)) \times \text{glycerine value of } K_2Cr_2O_7 \times 128}{10} =$$

Liquid ounces per gal. of glycerine

8. BORIC ACID

Filter the emulsion remaining in the distilling flask after the e xpulsion of ammonia (doble salt determination), through a thin pulp mat in a Buchner funnel. Wash with hot water. Transfer the filtrate to a clean beaker and render slightly acid to litmus with HC1. Boil thoroughly to expel carbonates introduced as impurities in the sodium hydroxide. Now make the solution slightly alkaline with normal NaOH from which the carbonates have been removed by precipitation with $BaC1_2$ (no excess of $BaC1_2$ should be present). Digest at the boiling point for a few minutes and if any precipitate forms, filter. Cool the clear solution and add methyl orange indicator solution. Exactly neutralize with normal HC1 solution. Add phenolphthalein indicator, 30 c.c. of pure neutral glycerine, and titrate to alkalinity with normal NaOH. Add 10 c.c. more of glycerine and if the alkaline color fades, continue the addition of normal alkali and glycerine until the end point is permanent.

$$\frac{\text{C.c. NaOH} \times .062 \times 133.5}{50} = \text{Oz. per gal. } H_3BO_3$$

Note—The plating solution may be tested for boric acid qualitatively by acidifying a small portion and immersing in it a strip of turmeric test paper. When the paper dries it will acquire a red color if boric acid is present.

9. ZINC* (Impurity)

Pipette 100 c.c. of the plating solution into a large beaker. Add in small portions, with constant stirring, a concentrated solution of postassium or sodium cyanide until the

quantity of the dichromate solution with the ferrous sulphate solution, observing the end-point as above. To deprecipitate of nickel cyanide is dissolved. Avoid an excess of the alkali cyanide. Digest and filter off hydroxides. To the filtrate add 20 c.c. of a 10% solution of sodium sulphide. Digest until the precipitated sulphides coagulate. Filter. If the precipitate is dark, dissolve in a little warm dilute H_2SO_4, neutralize with NaOH, add alkali cyanide soluton and sodium sulphide as before, reprecipitating zinc sulphide. Wash the precipitate well, dissolve again with warm dilute sulphuric acid, neutralize with NaOH in excess, add 1 gram of NH_4C1 and electrolyze zinc on a coppered cathode.

$$\frac{\text{Grams zinc} \times 133.5}{100} = \text{Oz. per gal. of zinc}$$

10. IRON (Impurity)

If the iron is present in a considerable quantity it may be determined in the hydroxide residue found in the determination of magnesium. If the quantity is minute a larger sample must be treated as in that determination to precipitate the ferric hydroxide. From this point the iron may be estimated by any standard volumetric method.

Grams per c.c. Fe x 133.5=Oz. per gal.

11. LEAD (Impurity)

By repeated evaporation with nitric acid convert all of the dissolved salts to nitrates. Dilute with water and add nitric acid to total 10%. The lead may now be electrolyzed upon platinum and weighed as lead peroxide, or may be dissolved from the anode and determined by other gravimetric process.

Grams per c.c. PbO_2 x .866 x 133.5=Oz. per gal. lead

12. COPPER (Impurity)

Copper may be determined by the same procedure as lead, being deposited as metal on the cathode under the conditions by which the lead is deposited on the anode.

Grams per c.c. Cu x 133.5=Oz. per gal. copper

13. ACIDITY

See M. R. Thompson,
Transactions American Electrochemical Society.
1922, 42, 233.

Bureau of Standards, L. C. 82
L. J. Gillespie, Journal American Chem. Soc.
1920, 42, 742.
*Chem. Abst. 1922 Pp. 1545-1546.

SECOND CALL

To the Members, Friends and Patrons of the A. E. S.:

First Call for the Educatonal Program for the 1924 A. E. S. Convention to be held in Milwaukee, Wisconsin, June 30, July 1, 2 and 3.

The Committee in charge of the technical papers to be read and discussed at our next Convention is desirous of receiving papers on electroplating or any other subject relating to the finishing of metals, etc.

The time for preparing educational papers and features for the Convention is at hand, and as the success of the Convention depends largely on the educational program and features, we earnestly request all members and friends of our society to prepare the papers they wish to present at our next Convention as early as possible.

We earnestly request the branch secretaries to call attention to the members that this work should not be delayed; also would like the members to give us name and address of any one of our friends who they know are in a position to prepare a technical or practical paper or any other subject that would be of interest to the electroplater.

We shall expect to hear from you just as soon as you can furnish us with some definite information along this line. It is our desire that all papers shall be in the hands of the Committee by May 1, 1924.

Yours most respectfully,
TEHNICAL PAPERS COMMITTEE.
Dan. Wittig,
A. E. Kienth.

P. S.—Address all communications in regard to the educational program to Dan. Wittig, 375 3rd Street, Milwaukee, Wisconsin.

BRANCH NEWS

Pittsburgh Branch

Our meeting of Saturday, November 3, was well attended, and we had a very interesting meeting. I am in hopes that this will give the boys

some new life and that they will be more faithful in attendance. We received one new applicaion, in the person of Mr. R. W. Tillotson, 2406 Plum Street, Erie, Pa., for active membership.

Cincinnati Branch

The Cincinnati Branch, A. E. S., are now and hereafter meet every Thursday night at 7:30 P. M. at the Vocational Training School at Spring and Liberty Streets, east of Broadway, where we will have every facility to advance our studies and test to go forward. It will be a fully equipped laboratory with everything needed, with lots of room to move about to make it pleasant while at just such work, and all necessary means to get at with some results; also at the meeting on Thursday, November 8, the attendance was the best yet, and I think it due to the good quarters that we meet in hereafter, as there will be something there in store for all and all A. E. S. members who are in Cincinnati on the meeting night, namely, Thursday night, at 7:30, up to 9:30, are welcome to get in line and with a hearty welcome from the boys of Cincinnati Branch.

Hartford-Connecticut Valley Branch

Hartford-Connecticut Valley Branch met on Monday, October 22, with President Vibberts in the chair and thirteen members present. Two new applications were received—one for active and one for associate membership.

The banquet committee had made extensive plans for the banquet of the Connecticut Branches, but owing to the impossibility of securing adequate hotel accommodations, it was necessary to postpone the affair indefinately.

A committee of two was appointed to arrange an open meeting in New Britain, Conn., during November. There will be one or two prominent speakers and cigars and refreshments will be served. This Branch expects to gain several new members from New Britain and vicinity.

Cleveland Branch

October 28, 1923, the Cleveland Branch of the A. E. S. held their regular October business meeting at the Winton Hall at 8:15 P. M. All of our officers were present, with Mr. Ter Doest presiding. We had a lively discussion on "Nickel and Brass Solutions."

Dayton Branch

In July Mr. Walter Fraine rendered us a profitable evening by reporting in detail, as Walter alone can, on the Providence Convention, even to the clam dinners, which, I am afraid, we Westerners can't quite appreciate. But we did appreciate the synopsis he gave us of the various papers and discussions. He offered the opinion that, for its intellectual character, this was the best convention yet. From Walter this opinion is worth something, and it should be a source of satisfaction to our members to learn that the conventions are "getting better and better in all ways on the three convention days." THE REVIEW, the Metal Industry

and Brass World have now taken on a new meaning for the Dayton Branch since they will have the papers Mr. Fraine so clearly described, and not the least, we are proud to say, his own.

The August meeting was unusal in that it was held in Mansfield, Chic. At the invitation of Mr. C. VanDerau, Supervisor of Metal Finishes, of the Westinghouse Electric Products Company, most of the members of the Branch motored the 160 miles to visit the plant. Our entire morning was spent in going through the polishing, plating, enameling and inspection departmens. Our eyes were opened to observe such a large application of our business, with its automatic equipment, progressive routing, quantity production and detail inspection. We felt proud to acknowledge to Mr. Olin, the hospitable and genial General Manager, that we were electroplaters. And in addition we felt a larger pride in his recognition that one of our men, Mr. C. VanDerau ,and a member of the Dayton Branch, A. E. S., has accomplished so much in organizing and placing their products.

After the study of the plant the Westinghouse Company served an electrically evoked dinner which, considering its tastefulness, must have been through air agitation, filtering, high current density, plenty anode surface, etc. If anyone unfamiliar had witnessed the enjoyable consumption they would have to agree that the food'ode corrosion was 100%, and not a bite left. The afternoon was spent in seeing Hansfield, everyone enjoying the sights excepting Mr. Frank Boach who, through the enthusiastic driving of our popular secretary, Mr. Wm. Hohman, was prevented from seeing, for about five minutes, due to a bump on the head as only a Ford con bump. Sish! Bill hal some grape juice with a high C_2 H_5 plus content. Don't blame the Ford—blame Volstead.

The September meeting took place at Triangle Park amid the beauties of the hills, the trees, the winding river and, lest we forget the present in our enjoyment of the "forest primeval," there were seen above all the aeroplanes from McCook Field. This was our annual picnic and, believe me, we enjoyed it with games, contests and last, but not least, a splendid supper prepared at the Camp Log House.

The regular October meeting, in the absence of a program, was given over to a general questionaire and discussion. Fortunately the attendance was large and therefore, a very active discussion was had. Technical questions, shop routine, new finishes and trade conditions were freely discussed. The meeting adjourned with the unanimous feeling that the time was well spent. Some of the men expressed themselves as having received new ideas and a new grasp of things.

The November meeting was well attended, which in absence of a specific program, demonstrates that the members are interested in the work of the Society. The object of the meeting was to plan the work for the Winter months. Everyone took an enthusiastic part and will, as a result, have a definite job for the coming months. It is the object of the present officers to keep every member of the Branch busy and to assign them something definite to accomplish for the good of the Society. Among many other things our annual banquet date was set for our next regular

meeting on December 1st. Judging from the plans of the committee this promises to be better than the usual live banquets which, judging from the past, will have to "go some".

On account of an apparent labor depression and the number of our members out of work we have organized a Clearing house and through our secretary will keep a record of those desiring employment and positions open. We have been successful already in placing two men as a result of the frank discussion on the labor situation and our method of taking care of it.

A committee was appointed, on the vote of the Branch members, to take up the question of the second annual Exposition of the Metal Finishers.

Now the winter is here and the visiting and picnics of the summer are over. Watch the Dayton Branch dig in and prove that the A. E. S. is worth being associated with and a real factor in industry.

Chicago Branch

The Chicago Branch held its regular meeting October 13, with a good attendance, in spite of the rainy weather, and the members that could or would not attend surely missed a valuable meeting.

A committee was appointed to arrange for our annual banquet, with Mr. E. Lamoureaux as chairman, and the following members assisting: O. E. Servis, H. A. Gilbertson, Jas. Emmett, Wm. G. Bott, Rob. Meyers, C. E. Thornton, T. J. Liscomb, S. E. Huenerfauth, H. Magnus, J. P. Manz, F. J. Hanlon and P. J. Hazucha.

The Librarian then took charge of the meeting and things soon begun to hum, and it is only our regret that we did not have a stenographer there to take notes. We got to discussing rust-proof deposits on bumper bars and the conclusions were that quality is overlooked for quantity on account of cost and production, and it is the hope of our members that some day all bumper bars will be made out of rust-proof steel.

The question box was next opened, with the following results:

Question 1—What advantage is there to nickel plate steel articles before zinc plating?

Answer 1—None, a method of cleaning was suggested by using a nitric acid dip after pickling.

Question 2—What solution is considered best for localizing carbon in the case-hardening process? Acid copper or cyanide copper?

Answer 2—In most cases cyanide of copper is used, only where real heavy carbonizing is required it is advisable to use acid copper solution.

Question 3—How can a tough and hard deposit be obtained from an acid copper solution?

Answer 3—By using more free acid, higher current and agitation.

Question 4—What is a good immersion dip to tin brass?

Answer 4—Water 1 gal., tin chloride 2 ozs., caustic soda 2½ ozs., cyanide 1 oz.; use hot.

Question 5—Will cadmium adhere to die castings?

Answer 5—Yes, there can be a solution made that will deposit satisfactory on die casting.

Question 6—What makes gold drag under a burnishing tool; this happens on 24-carat deposits?

Answer 6—It was suggested that the temperature of the bath be reduced and the articles first given a light deposit of a lower carat.

Question 7—What is the cause for a rough deposit in a hot cyanide copper solution; also what is the cause of loose crumbs of copper clinging to the deposit? What is the remedy?

Answer 7—The reason might come from using the solution too hot or using too much current on both; it also happens where there is too much carbonate of soda in the solution. A good remedy is to take out one-third of the solution and replenish with a new and weaker solution.

Question 8—What is a good method to clean and silver plate small articles made of tungsten metal? These parts are too small to handle and scratch brush and must be handled in wire baskets. Deposit now peel off they are cleaned in soda ash, hot copper struck, then silver plated, but the deposit of silver does not adhere?

Answer 8—This proved to be a very interesting question, but unfortunately no one could recommend a definite way of plating these without getting into the same trouble.

Philadelphia Branch

The regular monthly meeting was held at the U. of P. October 4, President Gehling presiding, and a large attendance. After the regular order of business the meeting was turned over to Librarian Scott, who read a paper on black nickel and showed samples of finished gun parts. In conclusion a general discussion was held on brass-plated chains that showed spots after being in stock for some time, and other plating subjects, which held the members to a late hour.

Toronto Branch

Toronto Branch members responded to the call for a good attendance on October 22, in a very creditable manner. The feature of the evening was to be an address by Mr. Wade Hampton of the Imperial Oil Co. Unfortunately the gentleman was very ill and could not be present. As no preparation had been made for a possible vacancy in the speakers' list we turned the evening into a query session.

Toronto Branch has always balloted on applicants by the old slow slip of paper method. Mr. W. S. Barrows thought the system too antiquated, and at this meeting presented the society with an up-to-date ballot box and balls. Five black balls will hereafter be required to render a ballot unfavorable.

Question Box—Why is excess acid an advantage when using cadmium in nickel solution?

Answer—Acidity and resistance aids to brightness of deposit.

Question—Is a strictly soap solution preferable to a 50-50 soap and cleaning compound solution for soaking steel products?

Answer—Soap and sodium carbonate.

Question—Which is preferable in plating bath, sodium cyanide or potassium cyanide?

Answer—Postassium cyanide is best, affords less resistance than sodium cyanide, higher voltage overcomes this when using sodium cyanide, but the structure of deposit is not the same. However, cyanogen being the only property of the chemical the plater requires, and either NaCN or KCN only mediums to facilitate use of cyanogen, sodium cyanide would be best, as it contains approximately 60 per cent. cyanogen, while potassium cyanide contains but approximately 40 per cent.

Question—What causes copper to deposit on iron tank containing hot cyanide copper solution? What is remedy?

Answer—Tank receives negative current either through negative rod or solution. Anode surface smaller than cathode surface aids in preventing the deposit.

We expect to have Mr. J. T. Burt Gerrans as speaker at our November 26 meeting. He will inform us of the practical value of recent researches carried out at the electrochemical laboratories of the University of Toronto by Mr. A. H. Heatley, with respect to a new mathematical analysis and theory of the current distribution in plating baths. The subject will be made plain by means of a blackboard and stereoscopic views.

Bridgeport Branch

Following is the report of Bridgeport's October 19 open meeting and regular meeting of November 2, both meetings presided over by our president, J. W. Slattery, and various officers in their chairs: Our open meeting was attended by 50 persons, including members and visitors. Various ones present gave interesting talks of their experiences at plating and otherwise. One whom everybody likes to listen to favored with a few remarks upon the older platers and the new, which topic was well received and delivered, and will say Mr. Chas. Buchanan can put a thing over with a bang. After the talks were over a fine luncheon was served.

Bridgeport is going out for a large membership by the end of the year; figure to have at least 100 members, and everybody is working with the one object in view.

One new application was read.

Detroit Branch

Regular meeting of Detroit Branch, A. E. S., held Friday, November 2, 1923, President B. E. Miller presiding, with an unusually small attendance. Our Sarnia member, Frank Powers, fooled us by attending this instead of out-of-town members' meeting last month, but we were much pleased to have him with us again. Minutes of previous meeting read and approved. Communications from Supreme President J. E. Stirling, G. W. Griffiths and Frank Powers were received.

The application of Lot M. Everly for membership was received and turned over to board of managers for approval and will come up at next meetin.

Resignation of Harold K. Woodmansee was accepted because of serious illness.

Banquet will be discussed at next meeting.

Mr. E. G. Lovering submitted, under good of order, remedies for nickel itch, alkali sores of two different types; also sores from soldering, as well as acid copper sores.

Mr. Lovering has made exhaustive studies of these troubles and forwarded complete data to Mr. Herrick, which will, no doubt, be published in REVIEW in near future. Ed. always has "something up his sleeve" and generally shakes it out.

Two questions were submitted in box:

(1) Can rose metal be plated in acid copper solution direct? A

Answer—It can be done in standard acid copper solution.

(2) What is a good solution for black on brass tubing?

Answer—Sodium arsenate, ½ lb. sufficient sodium or potassium cyanide to form clear solution; water 1 gal.; use iron anodes.

Meeting adjourned at 10:30.

Chicago Branch

The Chicago Branch held its regular meeting November 11, and for some unknown reason the attendance was very poor. We are wondering what has happened and what has kept so many of the boys at home?

We had an invitation from the St. Louis Branch to attend their banquet on January 19, and no doubt Chicago Branch will be represented. We also had a communication from the convention committee of Milwaukee Branch for educational papers. This was turned over to our libarian and he received some pledges from the members to write papers for the convention.

The Banquet Committee reported that they secured the Elks' Club for our annual banquet, which will be held Friday evening, January 25, 1924. All necessary arrangements are being taken care of by the committee and they are reasonably sure that this will be the biggest banquet the Chicago Branch ever held.

The librarian had the following questions in the question box:

Question No. 1—Can traces of copper be removed from a silver solution after precipitating the silver with muriatic acid, and how?

Answer No. 1—By adding sufficient muriatic acid to redissolve the copper cyanide precipitate and then washing the silver chloride thoroughly with clean water.

Question No. 2—Can bicarbonate of soda be used in a nickel solution for neutralizing; if not, what results would it have on the solution?

Answer No. 2—Nickel carbonate was recommended for neutralizing nickel solution. No explanation was made what results bicarbonate of soda would give.

Question No. 3—Is there any advantage in using artificial abrasive in polishing sheet steel of thin structure over Turkish emery?

Answer No. 3—No advantage at all; artificial abrasives are best adapted for coarse polishing and roughing out work.

St. Louis Branch

Our regular meeting held on November 6 was well attended and interesting. President F. Menniges was in the chair. The committee on reservation of date for banquet reported that January 19 had been selected. It was decided to follow plan of last year, that of having educational session in afternoon, followed by dinner, entertainment and dance. E. J. Musick was appointed chairman of committee and G. S. Robins to preside at educational session.

One paper presented in the afternoon will be on a subject of interest to all manufacturers and superintendents, as well as electroplaters.

Three applications were received for active membership, and were referred to Board of Managers.

Our "Return Question Cards" are keeping Librarian F. Horath busy as well as keeping "pep" in our meetings. In due time these will be published.

Milwaukee convention was not forgotten. We will be represented in educational program, of course.

Waterbury Branch

The chemistry class of Waterbury Branch, consisting of twenty members, held its first session in the Crosby High School laboratory, the instructions being under the direction of Mr. Lynelyan of the Crosby faculty, assisted by Harold Pierson of the local branch. Considerable interest has been displayed in the work; the first subject taken up being the analyzing of copper solutions. The joint banquet of the Hartford-Bridgeport and Waterburg Branches, which was scheduled to take place in New Haven, November 10, has been postponed, due to the inability of the committee in charge to secure accommodations at any of the hotels, caused by the large number of visitors in the city attending the football game. The matter will be taken up again at some future date. At the meeting held November 9, Harold Pierson gave an interesting talk on chemistry, explaining to the members what a valuable asset the knowledge of same would be to them in solving their work problems. Norman Tice remarked on his recent Western trip, telling of the various large plating departments he had visited in that section. J. C. Oberender and Frank Townsend of the Bridgeport Branch were present and remarked on the good and welfare of the society. During the meeting the subject of using sal amoniac and carbolic acid in brass plating solutions was discussed to some extent. After the business session was over, Sergeant-at-Arms Jas. Leonard entertained at the piano and sang a number of his own compositions.

APPLICATIONS

Cleveland Branch

Martin Horwath .....9225 Sophia Ave., Cleveland, Ohio

Bridgeport Branch

John F. Courtney, Sr. .....239 Winthrop Ave., New Haven, Conn.

Toronto Branch

W. Redfern .....56 Helena Ave., Toronto, Canada
Wm. H. Cuming.....2 Elliott Ave., Lambton Mills, Ontario, Canada

Deroit Branch

Lot W. Everly

Pittsburgh Branch

R. W. Tillotson.....2406 Plum St., Erie, Pa.

Newark Branch

Peter F. Koebble.....1079 Salem Ave., Hillside, N. J.

St. Louis Branch

Theodore Riefling, Active .....4174 Botanical Ave., St. Louis, Mo.
Joseph T. Dieters, Active .....648 Jackson St., Quincy, Ill.
Eugene Tomlinson, Active .....108 Cleveland Ave., Wichita, Kansas

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ELECTED TO MEMBERSHIP

Toronto Branch

David Woodhouse.....No. 1 Paesley Ave., Toronto, Canada
James Weslby .....336 Cambria St., Stratford, Ontario, Canada

Chicago Branch

J. J. Gullis (Active).....1126 E. Prairie St., Decatur, Ill.

Philadelphia Branch

Wm. M. Carrick, Active .....663 N. 12th St., Philadelphia, Pa.
Ernest Eissele, Active .....2045 Wilmot St., Philadelphia, Pa.
Anthony Mancuso, Active .....627 Park Ave., Pensauken, N. J.
Bennett A. Fulmer, Active .....619 E. Chestnut St., Lancaster, Pa.
Custer W. Rau, Active .....629 State St., York, Pa.

Milwaukee Branch

Roy G. Hunt (Active) .....212 10th St., Milwaukee, Wis.

TRANSFERRED

From St. Louis to Chicago Branch

Foraday J. Strock .....2920 Carroll Ave., Chicago, Ill.

RESIGNATIONS

Detroit Branch

Harold K. Woodmansee, on account of illness

SUSPENDED

Toronto Branch

C. S. McAully.....13 Park St., N. Hamilton, Ontario, Canada
Winefred Thompson..c|o Meredian Britania Co., Hamilon, Ontario, Canada
Frank J. Stunkard .....Merreton, Ontario, Canada
Wm. J. Salmon .....39 Lark St., Toronto, Ontario, Canada
Samuel Findlay .....79 New Market Ave., Toronto, Ontario, Canada

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REINSTATEMENTS

Toronto Branch

T. Chas. Orr.....1100 4th Ave., Owen Sound, Ontario, Canada

BOSTON

Regular meetings are held third Friday of each month, at 8 p. m., at the American House, Boston. Secretary, A. W. Garrett, 821 Dorchester Ave., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, David Fleming, 97 Roosevelt St., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Hardware Club of Chicago, Room 1125. Secretary, R. J. Hazucha, 5128 Warwick Ave., Chicago, Ill.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Hotel Winton. Secretary, H. S. Kneeland, 3924 Clybourne Ave., Cleveland, Ohio.

HARTFORD-CONN. VALLEY

Meets on the fourth Monday of each month at 747 Main St., Hartford, Conn. Secretary, Tennant Elwin, 14 Fredrick St., Hartford, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Wm. Hohman, 123 N. Webster St., Dayton, Ohio.

DETROIT

Meets first Friday of each month at the Old Colony Club, 2nd floor, Hotel Tuller. Secretary, E. W. Woodmansee, 1427 Lee Place, Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N.E. Secretary, Chas. S. Whalley, 931 Pine Ave., N.W., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Lipps Hall, 321 3d St. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Meets every Friday at 84 Craig St. West. Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at No. 17 Central Ave., Newark, N. J. at 8 p. m. Secretary, George Reuter, 55 Revere Ave., Hilton, N. J.

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, John E. Sterling, 468 Grand Ave., Long Island City, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, Robert Crook, 185 County St., Attleboro, Mass.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Hotel Seneca. Albert H. Doering, Secretary, 49 Cutler St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDA

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, W. W. Weiker, 411 3d St., Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Walter L. Barrows, 628 Dover Court Road, Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. F. Guilford, 230 Cooks St., Waterbury, Conn.